

**What is claimed are:**

1. A method of manufacturing non-volatile memory device, comprising the steps of:

forming a floating gate on a semiconductor substrate;

5 implementing nitrification treatment for the top surface of the floating gate;

forming a silicon nitride film on the floating gate experienced by the nitrification treatment;

forming a metallic oxide film on the silicon nitride film;

10 implementing annealing in order to supplement oxygen for the metallic oxide film; and

forming a control gate on the metallic oxide film.

2. The method as claimed in claim 1, further comprising the step  
15 of forming a native oxide film on the floating gate experienced by the nitrification treatment before the step of forming the silicon nitride film after the step of implementing the nitrification treatment.

3. The method as claimed in claim 1, wherein the nitrification  
20 treatment is implemented using a  $\text{NH}_3$  gas in the furnace.

4. The method as claimed in claim 3, wherein the nitrification treatment is implemented at a temperature of  $600 \sim 850^\circ\text{C}$  and a pressure of  $10 \sim 100\text{torr}$  for  $30 \sim 120$  minutes.

5. The method as claimed in claim 1, wherein the silicon nitride film is formed using a  $\text{NH}_3$  gas and a  $\text{SiH}_2\text{Cl}_2$  gas, or the  $\text{NH}_3$  gas and a  $\text{SiH}_4$  as a source gas by means of a low pressure-chemical vapor deposition (LP-CVD) method.

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6. The method as claimed in claim 5, wherein the silicon nitride film is formed in thickness of about  $3\sim 150\text{\AA}$  at a temperature of  $600\sim 800^\circ\text{C}$  and a pressure of  $0.05\sim 0.5\text{torr}$ .

10 7. The method as claimed in claim 1, wherein the metallic oxide film is a  $\text{Ta}_2\text{O}_5$  film, a  $\text{TiO}_2$  film, a  $\text{Ta}_3\text{N}_4$  film or a TaON film.

8. The method as claimed in claim 7, wherein the metallic oxide film is formed in thickness of about  $20\sim 150\text{\AA}$  using a metal precursor as a  
15 source gas and oxygen ( $\text{O}_2$ ) as a reaction gas.

9. The method as claimed in claim 1, wherein the annealing is implemented under an oxygen ( $\text{O}_2$ ) atmosphere or a  $\text{N}_2\text{O}$  atmosphere at a temperature of about  $700\sim 900^\circ\text{C}$  by means of a rapid thermal process(RTP)  
20 or furnace annealing.